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(71)出願人 000004709

株式会社ノーリツ  
兵庫県神戸市中央区江戸町93番地

(72)発明者 池内 康秀  
兵庫県神戸市中央区江戸町93番地 株式会  
社ノーリツ内

(72)発明者 松田 昌明  
兵庫県神戸市中央区江戸町93番地 株式会  
社ノーリツ内

(74)代理人 100091834  
弁理士 室田 力雄

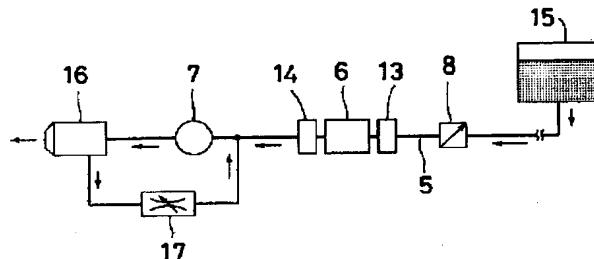
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(54)【発明の名称】 石油燃焼装置

(57)【要約】

【課題】 油供給路内を流れる油の流れ方向にかかわらず、油流量検出器に混入異物が付着したり、接触して損傷を起こしたりするのを未然に防ぎ、油流量検出器が常に正確な流量を検出することができる石油燃焼装置を提供することを課題とする。

【解決手段】 石油タンク15からの石油を油供給路5に設けた油流量検出器6及び電磁ポンプ7を介して燃料噴霧ノズル16に供給し、燃焼を行うようにした石油燃焼装置であって、上記油流量検出器6を挟むかたちで油供給路5の上流側及び下流側の両方に各々、油に混入している異物を除去するためのフィルタ13、14を設けた。



## 【特許請求の範囲】

【請求項1】 石油タンクからの石油を油供給路に設けた油流量検出器及びポンプを介して燃料噴霧ノズルに供給し、燃焼を行うようにした石油燃焼装置であって、上記油流量検出器を挟むかたちで油供給路の上流側及び下流側の両方に各々、油に混入している異物を除去するためのフィルタを設けたことを特徴とする石油燃焼装置。

【請求項2】 下流側のフィルタの篩目を上流側のフィルタの篩目よりも粗に構成していることを特徴とする請求項1に記載の石油燃焼装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】 本発明は、例えば給湯器の燃焼部として用いることができる石油燃焼装置に関する。

## 【0002】

【従来の技術】 従来、給湯器等の燃焼部として用いられる石油燃焼装置においては、石油タンクに液量計が設けられることがあっても、油供給路に油流量検出器を配置したもののはなかった。これに対して本出願人は、特願平10-321496号において、いわゆる傍熱型の油流量検出器を油供給路内に配置することで油供給路を流れる石油（灯油）の流量を検出できるようにした石油燃焼装置を提案した。

## 【0003】

【発明が解決しようとする課題】 ところが、上記提案にかかる石油燃焼装置においては、油供給路内に砂粒、切削切り粉、シールテープかす等の異物の混入があった場合、油供給路内に配置した傍熱型油流量センサ等の油流量検出器に異物が付着したり、或いは油流量検出器自体が異物の接触によって損傷を受けることで油流量検出器が正確な流量を検出できなくなるという不具合があつた。

【0004】 本発明は上記石油燃焼装置の有する不具合に鑑みて発明されたものであって、油供給路に配置した油流量検出器に対して混入異物が付着したり、或いは混入異物が接触して油流量検出器に損傷を來したりするのを未然に防ぎ、よって油流量検出器が當時、正確な流量を検出することができる石油燃焼装置を提供することを課題とする。

## 【0005】

【課題を解決するための手段】 上記課題を達成するため、本発明の石油燃焼装置は、石油タンクからの石油を油供給路に設けた油流量検出器及びポンプを介して燃料噴霧ノズルに供給し、燃焼を行うようにした石油燃焼装置であって、上記油流量検出器を挟むかたちで油供給路の上流側及び下流側の両方に各々、油に混入している異物を除去するためのフィルタを設けたことを第1の特徴としている。また本発明の石油燃焼装置は、上記第1の特徴に加え、下流側のフィルタの篩目を上流側のフィル

タの篩目よりも粗に構成していることを第2の特徴としている。

【0006】 上記第1の特徴によれば、油流量検出器の上流側にあるフィルタでは、燃焼運転時、即ち油が流れる方向（順流時）において異物を除去する。一方、下流側のフィルタでは、油流量検出器よりも上流側で配管を外した場合や燃焼停止時に燃料噴霧ノズル内の油圧が高くなつた場合に油が逆流する方向において異物を除去する。これによって、油が油供給路内の何れの方向に流れる場合であつても混入異物が油流量検出器の設置部位を流れることがない。よって、正確な油の流量の検出をすることができる。また上記第2の特徴によれば、第1の特徴による作用に加えて、油流量検出器の上流側にあるフィルタよりも油流量検出器の下流側にあるフィルタの篩目が粗となるように構成してあるので、通常時においては油と共に上流側のフィルタを通過した異物は下流側のフィルタをも容易に通過することになり、下流側のフィルタの手前（上流側）に異物が溜まることがない。よって、油流量検出器の前後にフィルタを一対配置した場合でも異物が油流量検出器に付着したり、検出を阻害したりするのを一層良好に防止することができる。

## 【0007】

【発明の実施の形態】 以下、本発明の実施の形態を図面を参照しながら説明する。図1は本発明の実施の形態を示す石油燃焼装置の全体概略構成図、図2は石油燃焼装置の油供給路部分における要部の第1の例を示す構成図、図3は石油燃焼装置の油供給路部分における要部の第2の例を示す他の構成図である。

【0008】 まず、本発明の石油燃焼装置の全体構成を図1を参照しながら説明する。この給湯器本体1は少なくとも缶体2、バーナ部3及び消音器4を含む排気部4等から構成されている。上記バーナ部3には、外部の石油タンク15からの石油が油供給路5に配した油流量検出器である傍熱型油流量センサ6及び電磁ポンプ7を介して燃料噴霧ノズルに供給され、燃焼が行われるようになっている。また、上記傍熱型油流量センサ6の上流側にはオイルストレーナ8が設けられており、該傍熱型油流量センサ6の下流側には燃料遮断弁である電磁弁9が設けられている。さらに10は燃焼制御のためのコントローラであり、11はファン、12はリモコン、12aはリモコンの警報用ブザー、12bは警報用ランプである。なお、上記傍熱型油流量センサ6は電磁ポンプ7、ファン11等の振動により流量検出レベルが狂うおそれがあるので、望ましくは正確な流量を検出できるように電磁ポンプ7、ファン11等からできるだけ離れた位置で、振動が伝わりにくい場所に取り付けられるものとする。

【0009】 本発明の油供給路部分における要部構成の第1の例を、図2を参照して説明する。傍熱型油流量センサ6を挟む形で油供給路5の上流側と下流側の両方

に、それぞれ油に混入している異物を除去するためのフィルタ13、14が設けられている。石油給湯器において給湯運転が指令されると、電磁ポンプ7が駆動され、石油タンク15からの石油が油供給路5をオイルストレーナ8によってゴミ等の比較的大きめの異物が取り除かれた後、傍熱型油流量センサ6を通ってリターン式の燃料噴霧ノズル16へ入り、バーナの燃焼が行われる。前記燃料噴霧ノズル16に入った石油の一部は、制御弁17を介して油供給路5に戻され、噴霧量が調節される。このとき、上記フィルタ13では燃焼運転時、即ち油が流れる方向(順流時)の異物が除去される。一方、フィルタ14では傍熱型油流量センサ6より上流側で配管を外したとき、或いは燃焼運転停止時にバーナ部3内の油圧が石油タンク15内の油圧より高い時等、通常とは違って石油が逆流してきたときの異物が除去される。このようにして、油供給路5内に混入した異物はフィルタ13、14によって効率的に取り除かれるので、傍熱型油流量センサ6への混入異物の付着が防止でき、油流量を正確に検出する傍熱型油流量センサ6が有する本来の機能を維持することができる。また、上記フィルタ13、14は何れも傍熱型油流量センサ6の両側近傍に設けてあるので、これらのフィルタ13、14と傍熱型油流量センサ6との間に異物が混入するおそれをより減少できる利点がある。

【0010】本発明の油供給路部分における要部構成の第2の例を、図3を参照して説明する。石油タンク15から燃料噴霧ノズル16への石油の流れ、及び傍熱型油流量センサを挟んで上流側と下流側にフィルタを設けた点は、上記第1の例の場合と同様である。この第2の例では、下流側にあるフィルタ14aの篩目の粗さを上流側のフィルタ13aの篩目の粗さよりも大きく設定している。即ち、下流側のフィルタ14aの篩目に比べて粗くすることで、上流側のフィルタ13aを通過した異物は下流側のフィルタ14aを容易に通過することになり、下流側のフィルタ14aに異物が溜まる可能性を極力小さくすることができる。従って、下流側のフィルタ14aの上流側にある傍熱型油流量センサ6が異物の付着等による悪影響を受けることがなく、正確な流量を検出することができる。これに対し、仮に下流側のフィルタ14aの篩目が上流側のフィルタ13aの篩目よりも小さければ、下流側のフィルタ14aに異物が溜まることになり、溜まった異物が傍熱型油流量センサ6に付着して検出感度を低下させる可能性が高くなり、正確な流量の検出を期待することができない。

【0011】また、給湯器本体1内の油供給路5のなるべく上流側で、傍熱型油流量センサ6の下流側に、燃料遮断弁である電磁弁9を設けている。バーナ部3が作動していない時に前記傍熱型油流量センサ6が流量を検出した場合は、コントローラ10は油漏れがあると判断し

て、前記電磁弁9をオフにして燃料を遮断し、油漏れを直ちに防止できるようになっている。また上記とは逆に、電磁弁9を傍熱型油流量センサ6の下流側に設ける替わりに、傍熱型油流量センサ6の上流側でオイルストレーナ8との間に設けるようにしてもよい。このようにした場合には、例えば傍熱型油流量センサ6が樹脂材料等で形成されていて、火災等によって異常高温にさらされたとしても、コントローラ10の指令により電磁弁9をオフにし、燃料が傍熱型油流量センサ6まで流れてくる手前で自動的に遮断することができ、該傍熱型油流量センサ6を火災から守ることができる。

【0012】コントローラ10が油漏れがあると判断した時は、上記のように電磁弁9を用いて燃料を遮断するようにしてもよいし、電磁弁9を設けずにリモコン12の警報用ブザー12aで警報(アラーム)を発し、または警報用ランプ12bの点滅させ、或いはその両方によつて、油漏れの異常を確実に知らせるようにしてもよい。勿論、その両方を用いて、電磁弁9で燃料を遮断し、リモコン12にて異常の警告をするようにしてもよい。これらリモコン12における油漏れの異常の警報・報知や電磁弁9のオンオフ動作は、全てコントローラ10の指令によって自動的に行われるようになっている。このようにして、油漏れは極力早めに検知でき、防止できるようになっているので、火災等のトラブルを未然に回避することができる。

【0013】なお、上記傍熱型油流量センサ6とオイルストレーナ8と電磁弁9とを一体化し、本体組立上、一部品として取り扱えるようにしておくと、部品点数、組立工数の削減及び部品管理の軽減が図れるという利点がある。

#### 【0014】

【発明の効果】本発明は以上のように構成され、請求項1に記載の石油燃焼装置によれば、石油タンクからの石油を油供給路に設けた油流量検出器及びポンプを介して燃料噴霧ノズルに供給し、燃焼を行うようにした石油燃焼装置であつて、上記油流量検出器を挟むかたちで油供給路の上流側及び下流側の両方に各々、油に混入している異物を除去するためのフィルタを設けたので、上流側のフィルタでは燃焼運転時の石油が流れる方向(順流時)において異物を除去し、下流側のフィルタでは油流量検出器よりも上流側で配管を外した場合や燃焼停止時に燃料噴霧ノズル内の油圧が高くなった場合等、油が逆流する方向において異物を除去することができる。従つて、石油が油供給路内の何れの方向に流れる場合においても、油供給路内に混入した異物が油流量検出器に付着することを効率的に防止することができ、油流量を正確に検出する機能が維持できる。また、油流量検出器の近傍にフィルタが設けられることで、油流量検出器とフィルタとの間に異物が混入するおそれが減少する。また、請求項2に記載の石油燃焼装置によれば、請求項1に記

載の構成による効果に加えて、下流側のフィルタの篩目を上流側のフィルタの篩目よりも粗に構成したので、上流側のフィルタを通過した異物は下流側のフィルタを容易に通過することになり、下流側のフィルタの手前（上流側）に異物が溜まることなく、油供給路内に混入した異物が油流量検出器に付着するのを防止でき、油流量を一層正確に検出することができる。

【図面の簡単な説明】

【図1】本発明の実施の形態を示す石油燃焼装置の全体概略構成図である。

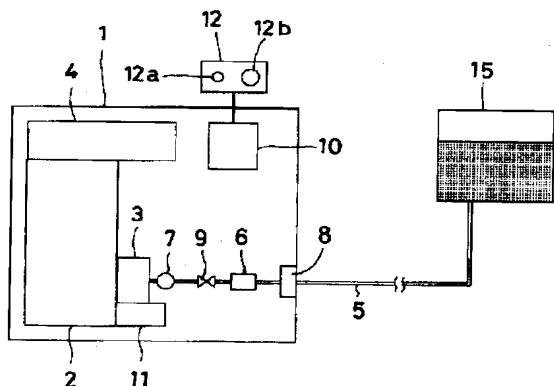
【図2】石油燃焼装置の油供給路部分における要部の第1の例を示す構成図である。

【図3】石油燃焼装置の油供給路部分における要部の第2の例を示す構成図である。

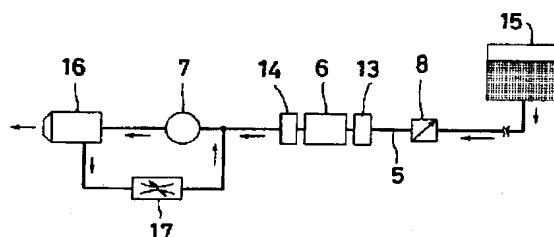
【符号の説明】

- 1 給湯器本体
- 2 缶体
- 3 バーナ部
- 4 排気部
- 5 油供給路
- 6 傍熱型油流量センサ
- 7 電磁ポンプ
- 8 オイルストレーナ
- 9 電磁弁
- 10 13、13a フィルタ
- 11 14、14a フィルタ
- 15 石油タンク
- 16 燃料噴霧ノズル

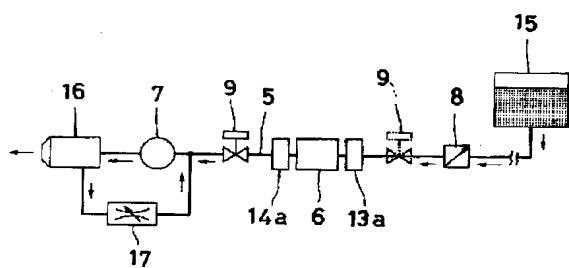
【図1】



【図2】



【図3】



フロントページの続き

(72)発明者 廣安 勝

兵庫県神戸市中央区江戸町93番地 株式会  
社ノーリツ内

(72)発明者 山崎 康

兵庫県神戸市中央区江戸町93番地 株式会  
社ノーリツ内

(72) 発明者 西海 正治  
兵庫県神戸市中央区江戸町93番地 株式会  
社ノーリツ内

(72) 発明者 平瀬 伸二  
兵庫県神戸市中央区江戸町93番地 株式会  
社ノーリツ内

(72) 発明者 土井 淳  
兵庫県神戸市中央区江戸町93番地 株式会  
社ノーリツ内

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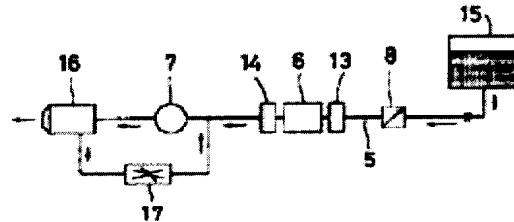
(71)Applicant : NORITZ CORP  
(72)Inventor : IKEUCHI YASUHIDE  
MATSUDA MASAAKI  
HIROYASU MASARU  
YAMAZAKI YASUSHI  
SAIKAI MASAHIRO  
HIRASE SHINJI  
DOI ATSUSHI

## (54) PETROLEUM COMBUSTION EQUIPMENT

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a petroleum combustion equipment for preventing adherence of a mixed foreign matter to an oil flow detector or damage caused by its contact irrespective of a flowing direction of the oil flowing in an oil supply passage and detecting an accurate flow rate when the detector is normal.

**SOLUTION:** In the petroleum combustion equipment comprising an oil flow detector 6 and an electromagnetic pump 7 provided at an oil supply passage 5 for supplying oil from an oil tank 15 to a fuel spraying nozzle 16 to burn the oil, filters 13, 14 for removing foreign matters mixed with the oil are provided at both upstream and downstream sides of the passage 5 through the detector 6.



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**CLAIMS**

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[Claim(s)]

[Claim 1]Petroleum from an oil tank is supplied to a fuel spray nozzle via an oil flow rate detector and a pump which were formed in an oil supply way, Petroleum combustion equipment which is the petroleum combustion equipment which was made to burn, and is characterized by forming a filter for removing respectively a foreign matter currently mixed in an oil in both the upstream of an oil supply way, and the downstream in a form which sandwiches the above-mentioned oil flow rate detector.

[Claim 2]The petroleum combustion equipment according to claim 1 constituting a mesh of a filter of the downstream from a mesh of a filter of the upstream in \*\*.

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[Translation done.]

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the petroleum combustion equipment which can be used, for example as a combustion part of hot water supply equipment.

[0002]

[Description of the Prior Art]Conventionally, in the petroleum combustion equipment used as combustion parts, such as hot water supply equipment, even if the volume meter might be provided in the oil tank, there was nothing that has arranged the oil flow rate detector on the oil supply way. On the other hand, these people proposed the petroleum combustion equipment which enabled it to detect the flow of the petroleum (kerosene) which flows through an oil supply way by arranging the oil flow rate detector of a what is called side thermal type in an oil supply way in Tokuganhei10-321496.

[0003]

[Problem(s) to be Solved by the Invention]However, in the petroleum combustion equipment concerning the above-mentioned proposal, When mixing of sand granules, cutting end powder, a sealing tape, or foreign matters, such as \*\*, is in an oil supply way, There was fault of it becoming impossible for an oil flow rate detector to detect an exact flow because a foreign matter adheres to oil flow rate detectors, such as a side thermal type oil flow rate sensor arranged in an oil supply way, or the oil flow rate detector itself receives damage by contact of a foreign matter.

[0004]This invention is invented in view of the fault which the above-mentioned petroleum combustion equipment has, It prevents a mixing foreign matter adhering to the oil flow rate detector arranged on the oil supply way, or a mixing foreign matter contacting and causing damage to an oil flow rate detector, and, therefore, an oil flow rate detector makes it SUBJECT to provide the petroleum combustion equipment which can always detect an exact flow.

[0005]

[Means for Solving the Problem]In order to attain an aforementioned problem, petroleum combustion equipment of this invention, Petroleum from an oil tank is supplied to a fuel spray nozzle via an oil flow rate detector and a pump which were formed in an oil supply way. It is the petroleum combustion equipment which was made to burn, and is characterized [ 1st ] by forming a filter for removing respectively a foreign matter currently mixed in an oil in both the upstream of an oil supply way, and the downstream in a form which sandwiches the above-mentioned oil flow rate detector. In addition to the 1st feature of the above, petroleum combustion equipment of this invention is characterized [ 2nd ] by constituting a mesh of a filter of the downstream from a mesh of a filter of the upstream in \*\*.

[0006]According to the 1st feature of the above, with a filter in the upstream of an oil flow rate detector, a foreign matter is removed in a direction (at the time of forward feed) into which it flows at the time of combustion operation, i.e., an oil. On the other hand, in a filter of the downstream, when oil pressure in a fuel spray nozzle becomes high at a case where piping is removed by the upstream, or the time of a combustion stop, in a direction in which an oil flows backwards, a foreign matter is removed from an oil flow rate detector. By this, even if it is a case where an oil flows in which direction of [ in an oil supply way ], a mixing foreign matter does not flow through an installation site of an oil flow rate detector. Therefore, a flow of an exact oil is detectable. an operation [ according to the 2nd feature of the above ] by the 1st feature -- in addition, a mesh of a filter which is in the downstream of an oil flow rate detector rather than a filter in the upstream of an oil flow rate detector -- rough -- \*\*, since it constitutes like, Usually, a foreign matter which sometimes passed a filter of the upstream with an oil will also pass a filter of the downstream easily, and a foreign matter does not collect before a filter (upstream) of the downstream. Therefore, it can prevent a foreign matter adhering to an oil flow rate detector, even when couple arrangement of the filter is carried out before and behind an oil flow rate detector, or checking detection much more good.

[0007]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described, referring to Drawings. The whole petroleum-combustion-equipment outline lineblock diagram in which drawing 1 shows an embodiment of the invention, the lineblock diagram showing the 1st example of an important section [ in / in drawing 2 / the oil supply way portion of petroleum combustion equipment ], and drawing 3 are other lineblock diagrams showing the 2nd example of the important section in the oil supply way portion of petroleum combustion equipment.

[0008]First, the entire configuration of the petroleum combustion equipment of this invention is explained, referring to drawing 1. This hot-water-supply-equipment main part 1 comprises exhaust air part 4 grade which contains the can 2, the burner section 3, and the silencer 4 at least. Petroleum from the external oil tank 15 is supplied to a fuel spray nozzle via the side thermal type oil flow rate sensor 6 and the electromagnetic pump 7 which are the oil flow rate detectors arranged on the oil supply way 5, and combustion is performed in the above-mentioned burner section 3. The oil strainer 8 is formed in the upstream of the above-mentioned side thermal type oil flow rate sensor 6, and the

electromagnetic valve 9 which is a fuel emergency trip valve is formed in the downstream of this side thermal type oil flow rate sensor 6. Further 10 is a controller for combustion control, and, as for a fan and 12, the buzzer for alarms of a remote control and 12b of a remote control and 12a are the lamps for alarms 11. Since the above-mentioned side thermal type oil flow rate sensor 6 has a possibility that a flow-rate-detection level may go wrong by vibration of the electromagnetic pump 7 and fan 11 grade, It shall be attached to the place where it is a position which is separated from the electromagnetic pump 7 and fan 11 grade as much as possible at so that a desirable exact flow can be detected, and vibration is not transmitted easily.

[0009]The 1st example of the important section composition in the oil supply way portion of this invention is explained with reference to drawing 2. The filters 13 and 14 for removing the foreign matter currently mixed in an oil, respectively are formed in both the upstream of the oil supply way 5, and the downstream in the form which sandwiches the side thermal type oil flow rate sensor 6. If ordered in hot water supply operation in petroleum hot water supply equipment, the electromagnetic pump 7 will drive, After the foreign matter by the oil strainer 8 in the oil supply way 5 in which petroleum of garbage from the oil tank 15 is comparatively larger is removed, it goes into the fuel spray nozzle 16 of a return type through the side thermal type oil flow rate sensor 6, and combustion of a burner is performed. Some petroleum included in said fuel spray nozzle 16 is returned to the oil supply way 5 via the control valve 17, and a spray volume is adjusted. At this time, the foreign matter of a direction (at the time of forward feed) in which it flows at the time of combustion operation, i.e., an oil, is removed with the above-mentioned filter 13. On the other hand, with the filter 14, at the time of a combustion operation stop, when piping is removed by the upstream from the side thermal type oil flow rate sensor 6, or when the oil pressure in the burner section 3 is higher than the oil pressure in the oil tank 15, a foreign matter when petroleum has flowed backwards unlike usual is removed. Thus, since the foreign matter mixed in the oil supply way 5 is efficiently removed with the filters 13 and 14, adhesion of a mixing foreign matter in the side thermal type oil flow rate sensor 6 can be prevented, and the original function which the side thermal type oil flow rate sensor 6 which detects an oil flow rate correctly has can be maintained. Since each has formed the above-mentioned filters 13 and 14 near the both sides of the side thermal type oil flow rate sensor 6, there is an advantage which can decrease more a possibility that a foreign matter may mix between these filters 13 and 14 and the side thermal type oil flow rate sensor 6.

[0010]The 2nd example of the important section composition in the oil supply way portion of this invention is explained with reference to drawing 3. The flow of petroleum from the oil tank 15 to the fuel spray nozzle 16 and the point of having formed the filter in the upstream and the downstream on both sides of the side thermal type oil flow rate sensor are the same as that of the case of the 1st example of the above. In this 2nd example, the granularity of the mesh of the filter 14a in the downstream is set up more greatly than the granularity of the mesh of the filter 13a of the upstream. That is, the foreign matter which passed the filter 13a of the upstream by making the mesh of the filter 14a of the downstream coarse compared with the mesh of the filter 13a of the upstream will pass the filter 14a of the downstream easily, and can make small a possibility that the filter 14a of the downstream will be covered with a foreign matter, as much as possible. Therefore, the side thermal type oil flow rate sensor 6 in the upstream of the filter 14a of the downstream cannot receive the adverse effect by adhesion of a foreign matter etc., and an exact flow can be detected. On the other hand, if the mesh of the filter 14a of the downstream is smaller than the mesh of the filter 13a of the upstream, A possibility of the foreign matter which the filter 14a of the downstream will be covered with a foreign matter, and collected adhering to the side thermal type oil flow rate sensor 6, and reducing detection sensitivity becomes high, and detection of an exact flow cannot be expected.

[0011]The electromagnetic valve 9 of the oil supply way 5 in the hot-water-supply-equipment main part 1 which is a fuel emergency trip valve in the upstream if possible at the downstream of the side thermal type oil flow rate sensor 6 is formed. While the burner section 3 is not operating, when said side thermal type oil flow rate sensor 6 detects a flow, the controller 10 judges that there is oil leakage, turns OFF said electromagnetic valve 9, intercepts fuel, and can prevent oil leakage promptly. It may be made to provide between the oil strainers 8 by the upstream of the side thermal type oil flow rate sensor 6 contrary to the above instead of forming the electromagnetic valve 9 in the downstream of the side thermal type oil flow rate sensor 6. When it does in this way, even if the side thermal type oil flow rate sensor 6 is formed with the resin material etc. and exposed to abnormally high temperature by the fire etc., for example, The electromagnetic valve 9 can be turned OFF by instructions of the controller 10, fuel can intercept automatically in this side through which even the side thermal type oil flow rate sensor 6 flows, and this side thermal type oil flow rate sensor 6 can be protected from a fire.

[0012]When it judges that oil leakage has the controller 10, It may be made to intercept fuel using the electromagnetic valve 9 as mentioned above, and you emit an alarm (alarm) at the buzzer 12a for alarms of the remote control 12, without forming the electromagnetic valve 9, the lamp 12b for alarms makes it blink, or it may be made to tell the abnormalities of oil leakage certainly by the both. Of course, using the both, fuel is intercepted with the electromagnetic valve 9 and it may be made to warn with the remote control 12 of abnormalities. All on-off control action of the alarm and information of the abnormalities of the oil leakage in these remote controls 12, or the electromagnetic valve 9 is automatically performed by instructions of the controller 10. Thus, since oil leakage can be detected a little early as much as possible and it can prevent, troubles, such as a fire, are beforehand avoidable.

[0013]The above-mentioned side thermal type oil flow rate sensor 6, the oil strainer 8, and the electromagnetic valve 9 are unified, and when it enables it to deal with a part as elegance, there is an advantage that reduction of part mark and the number of assemblers and mitigation of parts control can be aimed at on a body assembly.

[0014]

[Effect of the Invention]This invention is constituted as mentioned above, and according to the petroleum combustion equipment according to claim 1. Petroleum from an oil tank is supplied to a fuel spray nozzle via the oil flow rate detector and pump which were formed in the oil supply way. Since it is the petroleum combustion equipment which was

made to burn and the filter for removing respectively the foreign matter currently mixed in an oil was formed in both the upstream of an oil supply way, and the downstream in the form which sandwiches the above-mentioned oil flow rate detector. A foreign matter is removed in the direction (at the time of forward feed) into which petroleum at the time of combustion operation flows with the filter of the upstream. With the filter of the downstream, when the oil pressure in a fuel spray nozzle becomes high at the case where piping is removed by the upstream, or the time of a combustion stop, in the direction in which an oil flows backwards, a foreign matter can be removed from an oil flow rate detector. Therefore, when petroleum flows in which direction of [ in an oil supply way ], the foreign matter mixed in the oil supply way can be efficiently prevented from adhering to an oil flow rate detector, and the function to detect an oil flow rate correctly can be maintained. A possibility that a foreign matter may mix between an oil flow rate detector and a filter decreases by a filter being formed near the oil flow rate detector. Since the mesh of the filter of the downstream was constituted [ according to the petroleum combustion equipment according to claim 2 ] from a mesh of the filter of the upstream in \*\* in addition to the effect by the composition according to claim 1, The filter of the downstream will be passed easily, a foreign matter cannot collect before the filter (upstream) of the downstream, and the foreign matter which passed the filter of the upstream can prevent the foreign matter mixed in the oil supply way from adhering to an oil flow rate detector, and can detect an oil flow rate much more correctly.

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**TECHNICAL FIELD**

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[Field of the Invention]This invention relates to the petroleum combustion equipment which can be used, for example as a combustion part of hot water supply equipment.

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PRIOR ART

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[Description of the Prior Art]Conventionally, in the petroleum combustion equipment used as combustion parts, such as hot water supply equipment, even if the volume meter might be provided in the oil tank, there was nothing that has arranged the oil flow rate detector on the oil supply way. On the other hand, these people proposed the petroleum combustion equipment which enabled it to detect the flow of the petroleum (kerosene) which flows through an oil supply way by arranging the oil flow rate detector of a what is called side thermal type in an oil supply way in Tokuganhei10-321496.

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EFFECT OF THE INVENTION

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[Effect of the Invention] This invention is constituted as mentioned above, and according to the petroleum combustion equipment according to claim 1. Petroleum from an oil tank is supplied to a fuel spray nozzle via the oil flow rate detector and pump which were formed in the oil supply way. Since it is the petroleum combustion equipment which was made to burn and the filter for removing respectively the foreign matter currently mixed in an oil was formed in both the upstream of an oil supply way, and the downstream in the form which sandwiches the above-mentioned oil flow rate detector, A foreign matter is removed in the direction (at the time of forward feed) into which petroleum at the time of combustion operation flows with the filter of the upstream. With the filter of the downstream, when the oil pressure in a fuel spray nozzle becomes high at the case where piping is removed by the upstream, or the time of a combustion stop, in the direction in which an oil flows backwards, a foreign matter can be removed from an oil flow rate detector. Therefore, when petroleum flows in which direction [ in an oil supply way ], the foreign matter mixed in the oil supply way can be efficiently prevented from adhering to an oil flow rate detector, and the function to detect an oil flow rate correctly can be maintained. A possibility that a foreign matter may mix between an oil flow rate detector and a filter decreases by a filter being formed near the oil flow rate detector. Since the mesh of the filter of the downstream was constituted [ according to the petroleum combustion equipment according to claim 2 ] from a mesh of the filter of the upstream in \*\* in addition to the effect by the composition according to claim 1. The filter of the downstream will be passed easily, a foreign matter cannot collect before the filter (upstream) of the downstream, and the foreign matter which passed the filter of the upstream can prevent the foreign matter mixed in the oil supply way from adhering to an oil flow rate detector, and can detect an oil flow rate much more correctly.

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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention]However, in the petroleum combustion equipment concerning the above-mentioned proposal, When mixing of sand granules, cutting end powder, a sealing tape, or foreign matters, such as \*\*, is in an oil supply way, There was fault of it becoming impossible for an oil flow rate detector to detect an exact flow because a foreign matter adheres to oil flow rate detectors, such as a side thermal type oil flow rate sensor arranged in an oil supply way, or the oil flow rate detector itself receives damage by contact of a foreign matter.

[0004]This invention is invented in view of the fault which the above-mentioned petroleum combustion equipment has. It prevents a mixing foreign matter adhering to the oil flow rate detector arranged on the oil supply way, or a mixing foreign matter contacting and causing damage to an oil flow rate detector, and, therefore, an oil flow rate detector makes it SUBJECT to provide the petroleum combustion equipment which can always detect an exact flow.

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## MEANS

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[Means for Solving the Problem]In order to attain an aforementioned problem, petroleum combustion equipment of this invention, Petroleum from an oil tank is supplied to a fuel spray nozzle via an oil flow rate detector and a pump which were formed in an oil supply way, It is the petroleum combustion equipment which was made to burn, and is characterized [ 1st ] by forming a filter for removing respectively a foreign matter currently mixed in an oil in both the upstream of an oil supply way, and the downstream in a form which sandwiches the above-mentioned oil flow rate detector. In addition to the 1st feature of the above, petroleum combustion equipment of this invention is characterized [ 2nd ] by constituting a mesh of a filter of the downstream from a mesh of a filter of the upstream in \*\*.

[0006]According to the 1st feature of the above, with a filter in the upstream of an oil flow rate detector, a foreign matter is removed in a direction (at the time of forward feed) into which it flows at the time of combustion operation, i.e., an oil. On the other hand, in a filter of the downstream, when oil pressure in a fuel spray nozzle becomes high at a case where piping is removed by the upstream, or the time of a combustion stop, in a direction in which an oil flows backwards, a foreign matter is removed from an oil flow rate detector. By this, even if it is a case where an oil flows in which direction of [ in an oil supply way ], a mixing foreign matter does not flow through an installation site of an oil flow rate detector. Therefore, a flow of an exact oil is detectable. an operation [ according to the 2nd feature of the above ] by the 1st feature -- in addition, a mesh of a filter which is in the downstream of an oil flow rate detector rather than a filter in the upstream of an oil flow rate detector -- rough -- \*\*, since it constitutes like, Usually, a foreign matter which sometimes passed a filter of the upstream with an oil will also pass a filter of the downstream easily, and a foreign matter does not collect before a filter (upstream) of the downstream. Therefore, it can prevent a foreign matter adhering to an oil flow rate detector, even when couple arrangement of the filter is carried out before and behind an oil flow rate detector, or checking detection much more good.

[0007]

[Embodiment of the Invention]Hereafter, an embodiment of the invention is described, referring to Drawings. The whole petroleum-combustion-equipment outline lineblock diagram in which drawing 1 shows an embodiment of the invention, the lineblock diagram showing the 1st example of an important section [ in / in drawing 2 / the oil supply way portion of petroleum combustion equipment ], and drawing 3 are other lineblock diagrams showing the 2nd example of the important section in the oil supply way portion of petroleum combustion equipment.

[0008]First, the entire configuration of the petroleum combustion equipment of this invention is explained, referring to drawing 1. This hot-water-supply-equipment main part 1 comprises exhaust air part 4 grade which contains the can 2, the burner section 3, and the silencer 4 at least. Petroleum from the external oil tank 15 is supplied to a fuel spray nozzle via the side thermal type oil flow rate sensor 6 and the electromagnetic pump 7 which are the oil flow rate detectors arranged on the oil supply way 5, and combustion is performed in the above-mentioned burner section 3. The oil strainer 8 is formed in the upstream of the above-mentioned side thermal type oil flow rate sensor 6, and the electromagnetic valve 9 which is a fuel emergency trip valve is formed in the downstream of this side thermal type oil flow rate sensor 6. Further 10 is a controller for combustion control, and, as for a fan and 12, the buzzer for alarms of a remote control and 12b of a remote control and 12a are the lamps for alarms 11. Since the above-mentioned side thermal type oil flow rate sensor 6 has a possibility that a flow-rate-detection level may go wrong by vibration of the electromagnetic pump 7 and fan 11 grade, It shall be attached to the place where it is a position which is separated from the electromagnetic pump 7 and fan 11 grade as much as possible at so that a desirable exact flow can be detected, and vibration is not transmitted easily.

[0009]The 1st example of the important section composition in the oil supply way portion of this invention is explained with reference to drawing 2. The filters 13 and 14 for removing the foreign matter currently mixed in an oil, respectively are formed in both the upstream of the oil supply way 5, and the downstream in the form which sandwiches the side thermal type oil flow rate sensor 6. If ordered in hot water supply operation in petroleum hot water supply equipment, the electromagnetic pump 7 will drive, After the foreign matter by the oil strainer 8 in the oil supply way 5 in which petroleum of garbage from the oil tank 15 is comparatively larger is removed, it goes into the fuel spray nozzle 16 of a return type through the side thermal type oil flow rate sensor 6, and combustion of a burner is performed. Some petroleum included in said fuel spray nozzle 16 is returned to the oil supply way 5 via the control valve 17, and a spray volume is adjusted. At this time, the foreign matter of a direction (at the time of forward feed) in which it flows at the time of combustion operation, i.e., an oil, is removed with the above-mentioned filter 13. On the other hand, with the filter 14, at the time of a combustion operation stop, when piping is removed by the upstream from the side thermal type oil flow rate sensor 6, or when the oil pressure in the burner section 3 is higher than the oil pressure in the oil tank 15, a foreign matter when petroleum has flowed backwards unlike usual is removed. Thus, since the foreign matter mixed in the oil supply way 5 is efficiently removed with the filters 13 and 14, adhesion of a mixing foreign matter in the side thermal type oil flow rate sensor 6 can be prevented, and the original function which the side thermal type oil flow

rate sensor 6 which detects an oil flow rate correctly has can be maintained. Since each has formed the above-mentioned filters 13 and 14 near the both sides of the side thermal type oil flow rate sensor 6, there is an advantage which can decrease more a possibility that a foreign matter may mix between these filters 13 and 14 and the side thermal type oil flow rate sensor 6.

[0010]The 2nd example of the important section composition in the oil supply way portion of this invention is explained with reference to drawing 3. The flow of petroleum from the oil tank 15 to the fuel spray nozzle 16 and the point of having formed the filter in the upstream and the downstream on both sides of the side thermal type oil flow rate sensor are the same as that of the case of the 1st example of the above. In this 2nd example, the granularity of the mesh of the filter 14a in the downstream is set up more greatly than the granularity of the mesh of the filter 13a of the upstream. That is, the foreign matter which passed the filter 13a of the upstream by making the mesh of the filter 14a of the downstream coarse compared with the mesh of the filter 13a of the upstream will pass the filter 14a of the downstream easily, and can make small a possibility that the filter 14a of the downstream will be covered with a foreign matter, as much as possible. Therefore, the side thermal type oil flow rate sensor 6 in the upstream of the filter 14a of the downstream cannot receive the adverse effect by adhesion of a foreign matter etc., and an exact flow can be detected. On the other hand, if the mesh of the filter 14a of the downstream is smaller than the mesh of the filter 13a of the upstream, A possibility of the foreign matter which the filter 14a of the downstream will be covered with a foreign matter, and collected adhering to the side thermal type oil flow rate sensor 6, and reducing detection sensitivity becomes high, and detection of an exact flow cannot be expected.

[0011]The electromagnetic valve 9 of the oil supply way 5 in the hot-water-supply-equipment main part 1 which is a fuel emergency trip valve in the upstream if possible at the downstream of the side thermal type oil flow rate sensor 6 is formed. While the burner section 3 is not operating, when said side thermal type oil flow rate sensor 6 detects a flow, the controller 10 judges that there is oil leakage, turns OFF said electromagnetic valve 9, intercepts fuel, and can prevent oil leakage promptly. It may be made to provide between the oil strainers 8 by the upstream of the side thermal type oil flow rate sensor 6 contrary to the above instead of forming the electromagnetic valve 9 in the downstream of the side thermal type oil flow rate sensor 6. When it does in this way, even if the side thermal type oil flow rate sensor 6 is formed with the resin material etc. and exposed to abnormally high temperature by the fire etc., for example, The electromagnetic valve 9 can be turned OFF by instructions of the controller 10, fuel can intercept automatically in this side through which even the side thermal type oil flow rate sensor 6 flows, and this side thermal type oil flow rate sensor 6 can be protected from a fire.

[0012]When it judges that oil leakage has the controller 10, It may be made to intercept fuel using the electromagnetic valve 9 as mentioned above, and you emit an alarm (alarm) at the buzzer 12a for alarms of the remote control 12, without forming the electromagnetic valve 9, the lamp 12b for alarms makes it blink, or it may be made to tell the abnormalities of oil leakage certainly by the both. Of course, using the both, fuel is intercepted with the electromagnetic valve 9 and it may be made to warn with the remote control 12 of abnormalities. All on-off control action of the alarm and information of the abnormalities of the oil leakage in these remote controls 12, or the electromagnetic valve 9 is automatically performed by instructions of the controller 10. Thus, since oil leakage can be detected a little early as much as possible and it can prevent, troubles, such as a fire, are beforehand avoidable.

[0013]The above-mentioned side thermal type oil flow rate sensor 6, the oil strainer 8, and the electromagnetic valve 9 are unified, and when it enables it to deal with a part as elegance, there is an advantage that reduction of part mark and the number of assemblers and mitigation of parts control can be aimed at on a body assembly.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is the whole petroleum-combustion-equipment outline lineblock diagram showing an embodiment of the invention.

[Drawing 2]It is a lineblock diagram showing the 1st example of the important section in the oil supply way portion of petroleum combustion equipment.

[Drawing 3]It is a lineblock diagram showing the 2nd example of the important section in the oil supply way portion of petroleum combustion equipment.

[Description of Notations]

- 1 Hot-water-supply-equipment main part
- 2 Can
- 3 Burner section
- 4 Exhaust air part
- 5 Oil supply way
- 6 Side thermal type oil flow rate sensor
- 7 Electromagnetic pump
- 8 Oil strainer
- 9 Electromagnetic valve
- 13 13a Filter
- 14 14a Filter
- 15 Oil tank
- 16 Fuel spray nozzle

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[Translation done.]

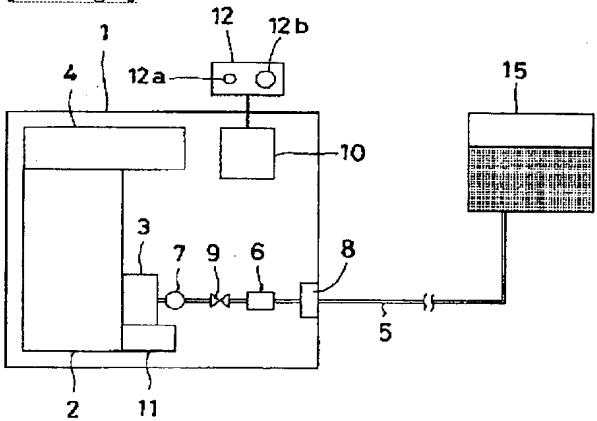
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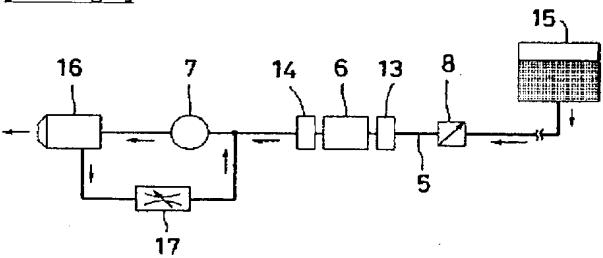
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DRAWINGS

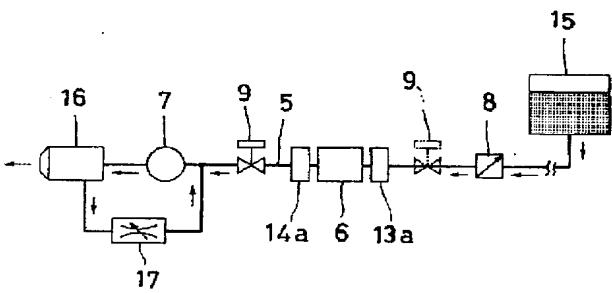
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]